

11 Immunity – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary 词汇

Write each word three times. 把每个单词抄写三遍。

English	中文	Write it 3 times (English)		
white blood cells	白细胞	_____	_____	_____
antibodies	抗体	_____	_____	_____
immune system	免疫系统	_____	_____	_____
pathogens	病原体	_____	_____	_____
phagocytes	吞噬细胞	_____	_____	_____
phagocytosis	吞噬作用	_____	_____	_____
enzymes	酶	_____	_____	_____
antigen	抗原	_____	_____	_____
self antigens	自身抗原	_____	_____	_____
non-self antigens	非自身抗原	_____	_____	_____
antibody	抗体	_____	_____	_____
plasma cells	浆细胞	_____	_____	_____
antigen-binding sites	抗原结合位点	_____	_____	_____

Recall

At IGCSE you learned that **white blood cells** 白细胞 defend the body against germs. Now we look at how they do it.

- Some white cells eat germs; others make **antibodies** 抗体.
- The body can tell its own cells apart from invaders.

Nothing here is harder than IGCSE — it just adds the right words.

New ideas

Read these first, then do the Practice.

■ 1 Phagocytes

The **immune system** 免疫系统 is the set of cells that defend the body against **pathogens** 病原体. The first to act are **phagocytes** 吞噬细胞 (a type of white blood cell).

A phagocyte destroys a pathogen by **phagocytosis** 吞噬作用:

1. it **engulfs** the pathogen (surrounds and takes it inside a vesicle).
2. it **digests** the pathogen with **enzymes** 酶.
3. it then **displays** the pathogen's antigen on its surface, to alert other cells.



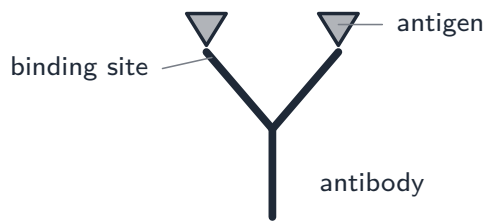
■ 2 Antigens: self and non-self

An **antigen** 抗原 is a molecule (usually a protein) on a cell surface that the immune system can recognise:

- **self antigens** 自身抗原 are the body's own markers — the immune system ignores them.
- **non-self antigens** 非自身抗原 are foreign (e.g. on a pathogen) — they trigger a response.

■ 3 Antibodies

An **antibody** 抗体 is a **Y-shaped** protein made by **plasma cells** 浆细胞. The two tips of the Y are **antigen-binding sites** 抗原结合位点. Each tip has a special shape that fits **one antigen only**, like a lock and key.



Antibodies stick to antigens, clump pathogens together, and mark them so phagocytes find them.

Watch out: an *antigen* is the marker on a cell surface; an *antibody* is the Y-shaped protein that binds it. Each antibody's binding site fits *one* antigen only (a complementary shape). Self antigens are ignored; non-self ones trigger a response.

Practice

Try these in order.

11.1 Name the process by which a phagocyte engulfs and digests a pathogen. [1]

11.2 Put these phagocytosis steps in order: digest, display antigen, engulf. [1]

11.3 What is an antigen? [1]

11.4 Explain the difference between a *self* and a *non-self* antigen. [2]

11.5 Describe the shape of an antibody and name the part that binds the antigen. [2]

11.6 Each antibody binds only one type of antigen. Explain why. [1]

11.7 Challenge. A transplanted organ can be “rejected” by the patient’s immune system. Suggest why, using the idea of self and non-self antigens. [2]